Canada

Transportation in Northern Canada

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Silent tracts of tundra, muskeg, boreal forest, snow and ice, broken only by the occasional splash of a paddle breaking the water or the swish of sled runners over the snow — this was the Arctic before the advent of modern technology. The islands and mainland area of the Arctic stretch north from the sixtieth parallel to the North Pole, and west from Baffin Island to Alaska.

The Indians who inhabited the Western Arctic paddled their lightweight canoes along the many waterways of the region in their search for game or fish. Larger canoes could transport war parties or move a tribe to a new hunting ground. Further east and to the north, Inuit fished from kayaks — small craft of sealskin stretched over a wood or whalebone frame and completely covered except for a cockpit for the paddler. The large Inuit craft was the *umiak,* meaning "women's boat". For their travels on land, both the Inuit and the Indians used sleds drawn by dog teams.

Search for Northwest Passage

European interest in the area began in the sixteenth century with the search for a Northwest Passage to the rich treasures of the Orient. Many early explorers are commemorated in Arctic place names — Frobisher, Hudson, Franklin, Parry. These explorers and those who came by land, such as Radisson, Mackenzie and Thompson, missionaries such as Bishop Grandin, early employees of the Hudson's Bay Company and others, often used the same travel methods as the native peoples — methods uniquely suited to the terrain and climate of the area.

In 1880, Britain transferred sovereignty in the Arctic to Canada. During the next few years, the Dominion government sent out expeditions to explore the possibility of navigation in the Hudson Bay and Strait. In 1903, the first real steps to assert sovereignty were taken with the voyage of the *Neptune,* a Newfoundland whaler which carried a detachment of the Northwest Mounted Police destined to form the nucleus of administration in the Northeastern Territories.

Arctic exploration

Two names are legendary in the tale of Arctic exploration — Captain Joseph Bernier and *CGS Arctic.* Between 1904 and 1926, Bernier made almost yearly trips to the waters of the Eastern Arctic in his stalwart wooden ship. Although he never achieved his ambition of navigating the Northwest Passage, he did explore much of this vast territory and was instrumental in affirming Canada's claim to sovereignty over the area. The first Canadian ship to traverse the Northwest Passage in both

directions was the RCMP vessel, *St. Roch*, in 1940 and 1944.

One major event sparked the development of the western part of the region, now the Yukon. In 1896, gold was discovered at Bonanza Creek in the Klondike. From 1897, when the news reached the world, to 1899, when the easily-found placer gold ran out, an estimated 100,000 people flocked to the area and the population of Dawson Creek mushroomed to some 40,000. (In 1921 it was down to 975.) In addition to the ring of the picks and the triumphant shouts of the men who found gold, the silence was soon broken by the chugging of stern-wheelers on the Yukon River and the rattle and whistle of the trains that ran on the new rail lines of the White Pass and Yukon Railway between Skagway, Alaska, and Whitehorse.

Birth of Arctic aviation

Gold is not the only valuable resource in the Arctic. As early as 1920, oil was found on the Mackenzie River north of Fort Norman. The need to develop this valuable commodity led to the birth of Arctic aviation. A mere 12 years after McCurdy's first Canadian heavier-than-air flight in the *Silver Dart,* the first flight north of 60 degrees took place when, in 1921, G.W. Gorman and Elmer Fullerton flew their German *Junkers* aircraft as far as Fort Simpson. Unfortunately, landing difficulties and accidents prevented them from reaching Fort Norman that year but their pioneering effort, flying without navigational aids, opened the way for major aviation operations and the development and settlement of Canada's northern territories. Dickens' flight to Aklavik in the early 1930s, the Yellowknife "rush" in 1937 and the development of a uranium mine near Fort Radium shortly after led to the establishment of the first rudimentary air routes.

This effort was accelerated during the Second World War, when the United States Air Force built a series of airfields across the Arctic to serve as refuelling stops for aircraft being ferried to the U.S.S.R. The building materials had to be transported and this in turn led to the development of waterways and construction of highways, especially the Alaska Highway, thus opening up the Arctic even more. After the war, in the late 1950s, a series of Distant Early Warning (DEW) radar stations was built across the North to detect aircraft approaching over the Arctic Ocean. The DEW stations made northern navigation more precise than it had been before and gave aviation an additional push. The airports built at these military sites during and after the war were the basis for all that followed.

Here and now

Silence no longer embraces the Arctic. The occasional splash of a paddle, or even the barking of a team of sled dogs can still be heard, but these nostalgic sounds are more likely to be drowned by the whine of a jet engine or the snarl of a snowmobile.

In southern Canada, most people rely on motor vehicles for getting to and from work, shopping, medical care, entertainment and so on. But in the entire Arctic there are fewer miles of road than are found in a small part of southern Ontario. People in many Arctic communities use the airplane in the same way as southern Canadians use public transportation.

Apart from moving people to their jobs at mines or drilling rigs, to major communities for shopping or schooling or to hospitals for emergency medical treatment, planes also transport many of the goods used in the North. Air transport is not cheap but aviation provides a vital communications link between small communities and between these communities and the major distribution centres of Yellowknife, Frobisher Bay, Resolute Bay, Rankin Inlet, Inuvik and Whitehorse.

Airport-building

More than 40 communities in the Arctic with a permanent population of between 150 to 900 are building or rebuilding airports under a program being undertaken jointly by Transport Canada, the Department of Indian and Northern Affairs, the Department of the Environment and the Department of National Defence. The program is expected to cost more than $80 million by the time all the facilities are completed. As they are opened, the airports will be operated by the communities; local residents are being trained to clear runways, take weather readings and provide radio communications with aircraft. The program is providing northern residents with valuable experience in the complex technical area of airport operations. It is hoped that by the mid-80s, when the program is finished, the quality of air service in the Arctic will have improved greatly.

The first aircraft used in the Arctic were similar to the *Junkers* flown by Gorman and Fullerton. Such planes as the Canadian-built de Havilland *Beaver, Otter, Twin Otter* and the *Dash-7,* which are capable of landing on and taking off from short runways, have been instrumental in bringing air services to isolated Arctic communities. In addition, during the long, cold winter months from January to May, air carriers make use of the Arctic ice to operate large aircraft. A 54-tonne plane can land safely on ice 2.13 metres or more thick, so such aircraft as the *Boeing*

737 or the Lockhead *Hercules* can fly personnel or supplies directly to oil exploration or construction sites in the North.

Ice-breakers

Because the cost of air transport is high, advantage is taken of the warmer summer months to move building materials, fuel, vehicles, household goods, clothing and food supplies by water. Since 1930, Canadian Coast Guard ice-breakers have been escorting convoys of commercial cargo ships and tankers to Hudson Bay and the Eastern Arctic. These ships carry supplies for federal government departments and agencies, the government of the Northwest Territories and other agencies, companies and individuals. They deliver tens of thousands of tonnes of cargo to more than 50 settlements throughout the Eastern Arctic.

Ice-breakers based on the Pacific Coast perform the same functions for Western Arctic communities. In addition, trains of barges owned by the Northern Transportation Company Limited (a Crown corporation) are towed up and down the Mackenzie River, bringing supplies to communities along its shores and along the Arctic coast. Further east, NTCL barges based in Churchill supply the communities along the Keewatin shore of Hudson Bay.

Land transportation

The Western Arctic also has two other ways of moving people and goods. The White Pass and Yukon Railway still operates on its 177 km of track between Skagway, Alaska, and Whitehorse. In addition to having a thriving passenger trade, the railway has been a leader in containerization and the concept of intermodal transportation. At its Skagway terminus, the railway operates a large ocean terminal and its ships steam between Skagway and Vancouver, carrying general cargo inbound and mining products outbound. At the other end, just beyond Whitehorse, special bins full of concentrates mined hundreds of kilometres farther north are transferred from trucks operated by the White Pass and Yukon Railway to rail flatcars for shipment to the sea. The narrow-gauge railway may seem like a quaint survivor of a bygone era, but it is a vital transportation link to residents of the Yukon.

The Western Arctic has a number of highways: the most important is the Alaska Highway, a joint Canadian-United States engineering feat which was built in less than ten months during the Second World War. It is still the main overland route to Alaska, and nearly 965 km of it are in the Yukon. Other arteries are the Robert Campbell Highway, the Klondike Highway, the Canol Highway

and several others, with the latest addition being the Dempster Highway linking Dawson by road to Fort McPherson and by ferry or ice bridge to Inuvik.

Looking ahead

The face of the North continues to change. It is important that transportation keep pace with the needs of northerners and with technological development, but, at the same time, not affect adversely the delicate ecology of this unique area. Resource-exploration and exploitation is already in progress and will become increasingly important as supplies of oil, gas and other natural resources become less readily available from existing sources.

This development relies heavily on transportation of different kinds. Canadian Marine Drilling Ltd. (CANMAR), a subsidiary of Dome Petroleum Ltd., began offshore drilling in the Beaufort Sea north of Tuktoyaktuk in 1975. The ice-strengthened drillships are supported by ice-breakers and other auxiliary vessels. The acquisition is possible of a much larger and more powerful ice-breaker which could extend the very brief drilling season and increase the productivity of this work. And, should the encouraging forecasts of the exploration companies become reality, some way will have to be found to transport the oil and gas safely to southern markets.

Two main approaches are being considered. One is the construction of one or more pipelines. Canada and the United States have agreed to build a pipeline along the Alaska Highway to move natural gas from Prudhoe Bay, Alaska, to markets in the mainland U.S. This pipeline, which will be 3,200 km long, will cross the Yukon Territory and three provinces. One of the Canadian government's main concerns is to protect the social, cultural and ecological environments of the areas the pipeline will cross. It is, therefore, preparing comprehensive regulatory (and control) procedures to ensure that the companies building the pipeline comply with all the requirements set down jointly by Canada and the United States.

Future energy sources

With the discovery of trillions of cubic feet of natural gas in the High Arctic, thought is being given to transporting this product. Although not commercially feasible at present, the rising cost of oil may make these gas deposits a desirable commodity in southern markets. If so, high-powered liquid natural gas (LNG) tankers, either with ice-breaking capability or helped along by an ice-breaking tug, may be plying their way through Arctic waters to East Coast ports by the mid-1980s.

Although these developments hold great possibilities for future

energy sources, they also provide the opportunity for major accidents or other incidents in Canada's Arctic waters. The Arctic Waters Pollution Prevention Act, passed by Parliament in June 1970, and its regulations, ensure that ships navigating in Canadian Arctic waters are designed, constructed, equipped, manned and operated in a way that present a minimal threat to the environment or safety of life. The Act provides for a fine of up to $100,000 for a ship, or $5,000 a day for a person polluting Arctic waters, as well as for a fine of up to $25,000 for failing to report such pollution.

In 1973, the Coast Guard initiated a study for a powerful new ice-breaker. At that time, a conventional Class 7 ship, i.e. an ice-breaker that can move forward without difficulty in ice 2.13 metres thick, was being considered. Since then, however, it has become apparent that a more powerful vessel will be needed to support such activities as oil and gas development. Plans now call for a Polar Class 8 ice-breaker capable of proceeding through 2.4 metres of Arctic ice without having to resort to ramming. The ship will have a propulsion power plant capable of supplying 100,000 horsepower to the propellers, making it the most powerful ice-breaker in the world.

A Polar 8 ice-breaker would not only support Canadian sovereignty in the Far North, but also would serve as an escort for vessels operating in the Arctic, for marine regulatory enforcement, surveillance, search and rescue, research, and as a control headquarters in the event of pollution or other environmental problems.

The ice-breaker would operate year-round in the Arctic with a complement of 117, with provision for additional accommodation for up to 44 persons for special operations. On the basis of design work to date, the vessel would have a displacement of 37,000 tonnes and over-all length of approximately 194 metres. Three propellers, each capable of absorbing 33,000 horsepower, would drive the vessel.

Whether the once-prevalent silence of the Arctic is broken by the swish of the dog sled or the whine of the jet plane, the problems of transportation in the area remain the same: the cold, the distance, the isolation, the harsh yet vulnerable environment. Technology holds great promise for Arctic transportation but also contains many inherent dangers. Industry and the governments involved are striving to ensure that the promises are fulfilled and the dangers avoided.

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